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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/459,641	12/13/1999	YOSHIHIRO IZUMI	1035-240	1435

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EXAMINER
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VOCKRODT, JEFF B

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/459,641

Applicant(s)

IZUMI ET AL.

Examiner

Jeff Vockrodt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1-6-04.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-68 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 18-58 and 62-68 is/are allowed.  
6) ☒ Claim(s) 1,3,4,7-9,11,13-17 and 59 is/are rejected.  
7) ☒ Claim(s) 2,5,6,10,12,60 and 61 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

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### DETAILED ACTION

This office action is in response to the new application filed on January 6, 2004. Claims 1-68 are pending.

#### *Claim Objections*

Claim 51 is objected to as it appears that it should depend from claim 25 rather than claim 21. Appropriate correction is required.

#### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**Claims 1, 3-4, 7-9, 13-15, and 59 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Pat. No. 6,342,700 ("Izumi '700") in view of U.S. Pat. No. 5,523,628 ("Williams").**

Claim 1 differs from claim 1 of Izumi '700 by reciting "space keeping members for keeping a space between the substrates."

Williams teaches placing an array of discrete stops (58) adjacent conductive bumps (64) that join a pixel readout substrate (28) and a detector chip (20). The stops provide protection and mechanical support.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of claim 1 of Izumi '700 to include an array of discrete stops among the conductive contacts to provide protection and mechanical support as taught by Williams.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claim 1, 3-4, 7-9, 13-15 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,420,452 ("Tran") in view of Williams.**

Tran teaches (Example 3, col. 9) a solid state radiation detector including: a pixel substrate having an array of polysilicon TFTs (40), an alignment layer (unlabelled conformal coating overlying the TFT and substrate in Fig. 3a), a detector substrate (38), and a metal contact (66) connecting the detector substrate with the readout circuitry via TFTs (40).

The pixel alignment layer is met by Tran. In this regard, it is noted that applicant's use of "alignment layer" seems to be an anachronism. In liquid crystal display (LCD) technology, the insulating layer formed between the TFT and the liquid crystal (LC) material was usually referred to as an alignment layer. An example of this is U.S. Pat. No. 5,398,127 ("Kubota"). However, in the present invention there appears to be nothing that is aligned by the "alignment layer." Applicants use the term "alignment layer" only in the sense that a person of ordinary skill in the art would associate the layer with an alignment layer in a LCD/TFT type device. Kubota is cited to show that a person of ordinary skill would associate the unlabelled conformal coating in Tran (discussed above) with a pixel alignment layer.

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Claim 1 differs from Tran by requiring "space keeping members for keeping a space between the substrates." Tran merely teaches conductive contacts (66) between the detector and readout substrates.

Williams teaches placing an array of discrete stops (58) adjacent conductive bumps (64) that join a pixel readout substrate (28) and a detector chip (20). The stops provide protection and mechanical support.

Tran and Williams are analogous art as they are both within the solid state radiation detector field.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to include an array of stops adjacent the contacts (66) in the radiation detector of Tran to provide protection and mechanical support as taught by Williams.

**Claim 1 corresponds to the subject matter of Tran in view of Williams as follows:** A two-dimensional image detecting device, which has a pixel substrate being provided with a pixel alignment layer including a plurality of pixels (Tran, see 32, Fig. 2), and an opposing substrate (Tran, Shottky barrier diode array layer 30) being provided with a photoconductive layer for generating electrical charge in response to incident light, comprising:

conductive connecting members (Tran, 66, Fig. 3A) which are disposed so as to correspond to the pixels on said pixel alignment layer (Tran, not labeled and layer 56, Fig. 3A) and which electrically connect said pixel alignment layer and said photoconductive layer (40), and

space keeping members (Williams, 58, Fig. 10) for keeping a space between the substrates.

Claim 3. The stops are insulators (Williams, col. 4, ll. 23-26).

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Claim 4. Williams teaches soft indium bumps and stops to protect those bumps implying that the stops are harder than the soft bumps.

Claim 7. Williams teaches a 6 micron indium bumps (col. 4, ll. 53-61).

Claim 8. Williams teaches indium, which is soft.

Claim 9. The thermoplastic stops 20 protect the soft indium bumps 24 in Williams.

Claim 13. The stop is made of a thermoplastic adhesive in Williams.

Claim 14. The detector can be CdTe (Tran, col. 6, 2d paragraph).

Claim 15. The photoconductive material is silicon, which exhibits photoconductivity to visible radiation.

Claims 59. The subject matter of Tran in view of Williams meets the limitations of claim 18 in a similar manner as it does claim 1. The electrode wires arranged in lattice form are present in the schematic depiction of the substrate in Fig. 2 of Tran. The method of bonding substrates to form the radiation detector is set forth in Example 3, col. 9.

**Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tran and Williams as applied to claims 1, 3-4, 7-9, 13-15 and 59 above, and further in view of U.S. Pat. No. 4,054,938 ("Morris").**

Tran and Williams collectively teach a thermoplastic resin material as a stop layer as discussed above. Claims 11 differs from Tran and Williams by requiring an epoxy, acrylic, or urethane as the space keeping member. Morris teaches that thermoplastics may be of an epoxy type (col. 4, ll. 45-52). It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the epoxy type thermoplastic taught by Morris in the device of Tran in view of Williams to function as a thermoplastic material.

**Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tran and Williams as applied to claims 1, 3-4, 7-9, 13-15 and 59 above, and further in view of U.S. Pat. No. 5,812,191 ("Orava").**

Tran and Williams collectively teach a radiation detector having a transistor readout circuit, but do not teach a storage capacitor in conjunction with the readout circuit. Orava teaches a readout circuit that uses a transistor in conjunction with a capacitor. (Orava, col. 4, ll. 28-29). Orava teaches using a capacitor to augment the charge accumulation function of a transistor. Orava, Tran, and Williams are within the field of radiation imagers. It would have been obvious to one of ordinary skill in the art at the time of the invention to include a capacitor in the device taught by Tran and Williams to augment the charge accumulation function of the transistor as taught by Orava.

***Allowable Subject Matter***

Claims 2, 5-6, 10, 12, and 60-61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

See prior office action for reasons of allowance previously set forth.

Claim 2 requires space keeping members in lattice form. The space keeping members of Williams are not in lattice form surrounding the conductive contact members. Williams Fig. 5 shows space keeping members 22 surrounding the contacts, but not in lattice form. Williams Fig. 10 shows space keeping members 58 in lattice form. Williams does not teach a lattice form that surrounds the conductive contact members and instead only shows space keeping members in rows along with the contacts.

Claims 18, 62, and 65 are allowed due to the photosensitive limitation as that limitation appears in the claims.

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Claims 24 and 67 are allowed for the reasons given by applicant in specifically addressing those claims.

### ***Response to Arguments***

Applicant's arguments filed January 6, 2004 have been fully considered but they are not persuasive.

Applicants arguments are based on Williams not teaching a lattice form. See reasons for allowance for claim 2 above. Williams does teach a lattice form, but does not teach a space keeping member lattice surrounding the contacts.

Williams and Tran are both related to solid state detectors. Both Williams and Tran deal with the problems related to contacting multiple substrates in solid state imagers. Williams teaches that indium bumps can be used where special space keeping members to prevent their collapse. A prima facie case of obviousness has been set forth.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


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Any inquiry concerning communications from the examiner should be directed to Jeff Vockrodt at (571) 272-1848. The examiner can be reached on weekdays from 9:30 am to 5:00 pm EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached at (571) 272-1852.

**The fax number for official correspondence is (703) 872-9306.** Unofficial communications to the examiner may be faxed to (571) 273-1848. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-0956.

April 5, 2004

J. Vockrodt



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